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## State of Women in Academia: Extent of Supportive Environment for Female Researchers

Khadija M. Althuwaimer Alrashidi

Public Authority of Applied Education and Training

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### Abstract

*While women's rights activists and advocates fight for equality in the professions, the state of women in academic research is not very impressive. Fewer women are actively undertaking major doctoral studies and research. Although the number increases at a very low rate, women's participation, specifically in science, technology, engineering, and information technology research at academic levels or for doctoral purposes, is minimal. In this situation, many acclaimed authors have reasoned that womanhood itself and gender-specific attributions cause low participation in academia. A few have referred to motherhood as well. At this juncture, this literature review explores whether environmental support and facilitation are more responsible for this situation than gender attributes are by approaching the topic from the viewpoint of the extent of environmental support for women researchers.*

**Keywords:** women in academia; research environment; female researchers.

### 1. Introduction

Because they are mostly devoted and assigned to tasks and activities related to home management and child raising, women, wives, and mothers usually have very little time for their careers, according to Cummins (2005). This situation becomes extreme when a woman is a single mother. Irrespective of women, wives, and mothers' raising of children and duties at home, specifically, women in academic research are widely perceived to stumble in their work for lack of support by administration and social policy. Moreover, the "mommy tracking" of women is often strongly emphasized over their actual positions in the workplace, and academic research is no exception. The result is obvious: low participation and low success in research conducted by women. In this setting, the current literature review explores the extent of a supportive environment for female researchers.

### 2. Method

This literature review focuses particularly on exploration of certain aspects related to women's performance in academic research—mentoring, "brain drain," gender bias, motherhood,—to gather a comprehensive notion of the supportive environment for women researchers. For this, approximately 14 scholarly studies have been selected from various journals using Internet searches for keyword combinations of *women in research*, *female doctoral research*, *motherhood and academic research*, *gender-based research performance*, *gender-specific research outcomes*, and similar phrases. From these results, further screening was added to select studies through review of their abstracts. Thus, only journal articles that matched, complemented, coordinated, or correlated with the research topic were reviewed. Finally, the literature review proceeds by referring to these studies' definitions of problems, research methodologies, findings, and implications.

### 3. Findings

#### 3.1 Female migration and brain drain

To determine gender bias in accessing economic opportunities, Bang and Mitra (2010) studied causes and consequences of brain drain. They reported that differences in schooling, literacy, and women's fertility rates significantly contributed to the brain-drain gender gap, acting as biases in accessing economic opportunities. The gender gap was used as the dependent variable for research in which independent variables included Gross Domestic Product (GDP), population, unemployment, democracy, credibility, transparency, security, access, and outcomes. Regression analysis showed that variations in access substantially and significantly affected outcomes differentiation, as statistical significance emerged only for the equal-access factor. The authors called for further research on the subject because their work specifically addressed the migrant context.

Dumont, Martin, and Spielvogel (2007) conducted more specific research on gender-based brain drain and migrant women. According to these researchers, international migration flow is important because not only is it increasingly feminized but also shows an increasing tendency for migrant workers to engage in highly skilled work. Their study considered both aspects to show the brain drain's gender dimension. They found that despite increasing feminization, female migrant flow has remained in balance with its male counterpart as many people from poorer countries constantly leave their countries of origin, indicating that in their home countries, women still have access issues with academic achievement. Although highly educated mothers are more contributive to human capital accumulation, they are also more prone to migrate to developed countries with their offspring (Lipton, 2015).

With the specific objective of predicting non-linear relationships between women's rights at home and in destination countries, including the gender gap, Najed and Young (2014) conducted a gravity model analysis of bilateral migration flows. Their experimentation and statistical research showed that nonlinear relationships between women's rights at home and in the destination country did significantly indicate brain drain ratios.

#### 3.2 Women in academia

The next part of this literature review focuses particularly on women in academia, beginning with the work of Kaplan (1985), who took an experimental research approach to understanding women in academia. She compiled most of the theoretical findings and acknowledged them through an argumentative approach. Still, her work is important for this review. Kaplan argued that many acts and behaviors, both verbal and nonverbal, had long served two purposes—either to silence women in academia or to isolate them from political and intellectual positions. In the study, she supported her conviction with a variety of logical arguments.

According to Penney, Young, and Badenhorst (2015), women have received minimal to no opportunities and encouragement because the cognitive world, created by men, never naturally portrayed women in the same style of discourse. It was men who defined academic rules, which are mostly conservative in nature, although in some incidences, women have successfully remained in mainstream education. Penney et al. (2015) argued that men should acknowledge women's contributions, use their works as references and cite them, passionately accept female contributors, and become engaged with women in both formal and informal methods of research. In addition, Kaplan (1985) proposed recommendations such as ensuring equal representation in the organization of seminars and conferences, encouraging acknowledgement of women's contributions in research, and encouraging young women to pursue academic research, utilize their debating skills, and be more communicative.

What Kaplan (1985) demonstrated in her theoretical and qualitative work can be validated by the notes of Sullivan, Callister, and Hult (2006), who stated that in 2001, 42% of full professors in two-year colleges were women, but in doctoral-granting institutions, only 17% were full professors. Furthermore, institutions offering science, engineering, and technology degrees had fewer women in high faculty positions. These technology institutions were less likely to have senior faculty positions for women but did prefer women for junior positions. Women's representation at the departmental faculty level was less than 15%–17%. In fact, these figures revealed that in academic practices, some matters of gender stereotyping emerge from gender-base schemas and affect performance by moderating women's expectations.

Lee (1993) studied historic datasets on this subject for the 1960–1989 period. Her statistical analysis revealed that women remained a minority in positions as university teachers, although the situation's rate of change was high. However, women teachers were mostly concentrated in traditional faculties, and for women with higher academic rank, there was a downward trend. Many female faculty members did not even possess a doctoral degree while their male

counterparts did. In addition, over a two-year period, a job-satisfaction survey on 42 science, engineering, and technology institutes revealed that women were more likely to work in administration, caused by shortage of resources, salary variations, and teaching job distribution. The same survey also revealed gender differences in obstacles to success and sources of dissatisfaction, which women ranked as follows: college interaction; tenure, promotion, and evaluation; work-family balance; and workload. For their male counterparts, work-family balance remained the least weighted factor (Ogbogu, 2011).

Armenti (2004) conducted in-depth interviews with 19 women professors in a Canadian university; all participants agreed that their career trajectories had been a lifelong challenge, especially balancing work and life with children. Childrearing problems, research dilemmas, delays in promotion, research completion, or findings-gathering have all affected them. By and large, these are reasons women receive less accommodation in the academic sphere. The women had concerns with ensuring a higher number of publications so that their quality was directly in contradiction to risk of infertility in women older than 35. Such concerns are acute, especially among students in doctoral programs, as described in self-recorded journals based on qualitative research assessment from Callary, Wethner, and Trudel (2012). With detailed journal notes, these authors claimed that in the process of being a PhD student, aspiring professor, and new mother, one undergoes various difficulties while differences in academic demand, social interactions, and, more importantly, peer support can have mutually positive relationships.

### 3.3 *Extent of supportive environment*

At this point, I focus on the extent of a supportive environment for women in academia by addressing the question of social and academic support for women researchers. Women researchers (and academicians) report more stress, symptoms of stress, and much less support from academies and families than do men. Indeed, women reported that family support does not directly impact stress symptoms but generates a buffering effect, whereas men reported the reverse. Women in research or in doctoral programs also indicated higher degrees of stress due to multiple roles and greater concerns for balancing academic and familial demands, according to Mallinckrodt and Leong (1992). Thus, the support they need should come from the social system, family, and the academy working together in dealing with stress, depression, and anxiety.

After surveying 458 female and male students, Andres (2004) concluded that women's support requirements are broadly equivalent to their parenting and mobility needs and less related to research or mentoring needs. Both men and women share equal interest in having children. Therefore, the support that women seek in response to their requirements for balance between academia and home is mostly self-selected, individually based, and self-developed because all academia and universities have strong policies for women researchers, supporting motherhood and childbearing.

Gilbert, Gallessich, and Evans (1983) conducted a deeper study, specifically on supervisor-researcher-student relationships in the same context. Results from 80 female and 77 male students showed that female research students were less likely to report stress and support requirements when they were supervised by female professors, but the situation reversed when they were supervised by male professors. Another study by Home (1997) showed that role strain, perception of role demand, perceived support, and stress continue to interact and transact with each other. This study involved 443 women respondents, revealing that the need for support increased with higher role demands, and when women could not cope, the result was increased stress. The author concluded that tangibility of support and access to support remained key in many studies of women in academic research, but the situation mostly concerned awareness and responsiveness both from female students and others and remains intangible in nature. Thus, a supportive environment for female students in higher-degree and research programs should be directly linked to the psychological difficulties that these students experience (Ek & Sanchez, 2013).

A key reason for decreased numbers of female science, technology, and engineering students, according to Hill and Corbett (2010), was their self-reported, self-assessed, and self-perceived ideas of complexity in the research process and involvement requirements, as well as their emphasis on prioritizing career and life goals toward a non-academic perspective. This means that most female students would ordinarily prioritize motherhood or family life over scholarly attribution in the future, irrespective of social and environmental supports and factors. This is a great hindrance to assessing social and even academic support because it does not allow researchers to reach a conclusion quickly about the efficacy, effectiveness, and comprehensive sustaining model of contemporary support mechanisms extended to female researchers for their distinct gender-based role.

Interestingly enough, Carney-Crompton and Tan (2002) mentioned that the level of support required by women at undergraduate, graduate, and postgraduate or research levels showed differences; female higher-degree or doctoral-

research students more independently reported their needs for support, but they tended to report them less often. Support concern from the environment, therefore, should have qualitative features.

### 3.4 How to enable a supportive environment

A key question remains: How do we ensure a supportive environment at home, in society, and at the academic level for female doctoral researchers who also have the liability and responsibility of motherhood? The work of Hartley and Dobeles (2009) can be considered here as its veracity and comprehensiveness in this specific matter is noteworthy. Nussbaumer (2013) declared that successful outcomes for women academic researchers depend on a number of factors. When these factors facilitated women's academic research, the result was successful female researchers. Therefore, the particular influence that these factors have should be the sole focus for making the entire system facilitative for women. If this involves family, friends, colleagues, supervisors, mentors, and institutions, then they must be correlated with women academic researchers' self-assessed reporting of support requirements. While the claim sounds undeniable, it needs to be tested with factual results.

## 4. Conclusion

Now, if we approach this subject from a different angle, we see a female researcher's success primarily defined by the number of publications and the amount of funding she secures. To produce these outputs, she needs to have the appropriate attitude, to demonstrate appropriate behavior, and to ensure that she adapts along with the research environment. Errors impacting quality are generally related to the research itself and affect all researchers—new or experienced, male or female. Responsibilities concerned with errors in coverage, sampling, measurement, and non-response rates are defined within research methodologies; they are not linked to or institutionalized for gender-specific treatment.

Then, for an environment that helps ensure successful generation of scholarly publication or secured funding, previous discussions have shown that family and the academy are very important. But family and academy are two dependent variables in the scope because they impact the same way and in the same direction as independent variables interact, coordinate, and correlate. As for family environment, the discussions above showed that marital status, family relationships, partners in affiliated industry, and partner's support along with its quality are all important independent variables. As for the academic environment, independent variables include the degree, research process, mentors or supervisors, academics, work space, communication, researcher's ambition, and so on.

Among all these variables, supervisors' experience with female researchers showed that conference proceedings development was influenced by only two factors, conducting research and age as help or hindrance. They also noted that journal publications were influenced only by marital-status factors. Single-handed submission of funding application can be influenced by marital status, social life, and paid work experience. Joint submission of funding application can be influenced by partners' involvement, their cultural background, and management of the partnership. Further exploration into the matter showed that working with more partners is more favorable while working with few partners is less preferred, and working alone is a matter only of personal preference. In addition, cultural diversity in a research team was reported to cause more hindrance than help. At the family level, the partner's own experience of conducting research, orientation of research management, research plan, and negative attitude toward research also defined the level of support that a female researcher could expect. Thus, knowing factors more deeply can prove effective in developing a framework for a supportive environment for women who aspire to academic research but often stumble on their multiple roles, gender, and other related issues.

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